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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/873,416	06/05/2001	Hidehiko Karasaki	MEIC:107	1853

7590 03/21/2003

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EXAMINER
LANDAU, MATTHEW C

ART UNIT	PAPER NUMBER
2815	

DATE MAILED: 03/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/873,416	KARASAKI ET AL.	
	Examiner	Art Unit	
	Matthew Landau	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 December 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *30 December 2002* is: a)☐ approved b)☒ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Drawings

1. The proposed drawing correction filed December 30, 2002 is acknowledged. In light of the amendments made to the specification, Figure 8 is not prior art. Therefore, the "Prior Art" labeled is not required.

Claim Objections

2. Claims 6, 7, 13, 14, 23, 24, 31, and 32 objected to because of the following informalities: it is unclear how a width of laser pulses can be "extracted from" a period of the laser. What is meant by the term "extracted"?

Claims 39 and 42 are objected to because the claims are identical.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 6-8, 13-15, 23-25, and 31-33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In regards to claim 6, the metes and bounds of the second pause period cannot be determined. The limitation "equal to a duration *comprising*" (emphasis added) implies that the second pause period may include any additional time component. Therefore, it cannot be

determined what value for the second pause period will satisfy the claim limitation. Note claims 7, 13, 14, 23, 24, 31, and 32 have similar problems.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 5-9, 18, and 22-26 are rejected under 35 U.S.C. 102(b) as being anticipated by the admitted prior art.

In regards to claim 1, Figure 13 of the instant application discloses a laser device for generating a laser pulse train formed of a sequence of laser pulses, comprising: an output mirror 24; a reflector mirror 21; a gain medium 23 disposes between said output mirror 24 and reflector mirror 21; a Q switch 42 located between said output mirror 24 and reflector mirror 21; and a nonlinear optical crystal 26 irradiated with a fundamental wave laser light by the laser oscillation for generating harmonic laser light. The intended use limitation "for turning on and off a laser oscillation by said output mirror, reflector mirror, and gain medium, said Q switch for turning on laser oscillation during a first pause period before a generation of the laser pulse train, and for turning off the laser oscillation during a second pause period before a generation of the laser pulse train" does not structurally distinguish the claimed invention over the prior art.

In regards to claim 5, Figure 13 of the instant application discloses said output mirror 24 is located between said reflector mirror 21 and said the nonlinear optical crystal 26.

In regards to claim 6, the intended use limitation "wherein the second pause period..." does not structurally distinguish the claimed invention over the prior art.

In regards to claim 7, the intended use limitation "wherein the second pause period..." does not structurally distinguish the claimed invention over the prior art.

In regards to claim 8, the intended use limitation "wherein a power of the laser pulse..." does not structurally distinguish the claimed invention over the prior art.

In regards to claim 9, Figure 13 of the instant application discloses a filter 28 for separating the harmonic laser light generated by said nonlinear optical crystal 26 and the fundamental wave laser light.

In regards to claim 18, the admitted prior art discloses a laser processing machine for processing an article, including a laser device for generating a laser pulse train formed of a sequence of laser pulses (see page 2, line 25 of the instant specification). Figure 13 of the instant application discloses a laser device for generating a laser pulse train formed of a sequence of laser pulses, comprising: an output mirror 24; a reflector mirror 21; a gain medium 23 located between said output mirror 24 and reflector mirror 21; a Q switch 42 located between said output mirror 24 and reflector mirror 21; and a nonlinear optical crystal 26 irradiated with a fundamental wave laser light by the laser oscillation for generating harmonic laser light. The intended use limitation "for turning on and off a laser oscillation by said output mirror, reflector mirror, and gain medium, said Q switch for turning on laser oscillation during a first pause period before a generation of the laser pulse train, and for turning off the laser oscillation during

a second pause period before a generation of the laser pulse train" does not structurally distinguish the claimed invention over the prior art.

In regards to claim 22, Figure 13 of the instant application discloses said output mirror 24 is located between said reflector mirror 21 and said the nonlinear optical crystal 26.

In regards to claim 23, the intended use limitation "wherein the second pause period..." does not structurally distinguish the claimed invention over the prior art.

In regards to claim 24, the intended use limitation "wherein the second pause period..." does not structurally distinguish the claimed invention over the prior art.

In regards to claim 25, the intended use limitation "wherein a power of the laser pulse..." does not structurally distinguish the claimed invention over the prior art.

In regards to claim 26, Figure 13 of the instant application discloses a filter 28 for separating the harmonic laser light generated by said nonlinear optical crystal 26 and the fundamental wave laser light.

In regards to claims 37 and 40, the intended use limitation "wherein said gain medium oscillates laser continuously" does not structurally distinguish the claimed invention over the prior art.

In regards to claims 38 and 41, the intended use limitation "said gain medium is irradiated with excitation light having an identical power during the first and second pause periods" does not structurally distinguish the claimed invention over the prior art.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 2 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Yin.

In regards to claims 2 and 19, the difference between the admitted prior art and the claimed invention is the nonlinear optical crystal is located between said output mirror and reflector mirror. Figure 1 of Yin discloses a laser device with a nonlinear optical crystal NC disposed between a mirror M1 and a reflector mirror M2. Yin discloses mirror M1 can be an output mirror (column 4, lines 60 and 61). In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of the admitted prior art by placing the nonlinear optical crystal between the reflector mirror and the output mirror. The ordinary artisan would have been motivated to modify the admitted prior art in the manner described above for the purpose of decreasing the size of the laser device.

9. Claims 3, 4, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Smart.

In regards to claims 3, 4, 20, and 21, the difference between the admitted prior art and the claimed invention is a harmonic dispensing device (optical modulator) located in an output path

of the laser pulse. Figure 1 of Smart discloses a laser device with a harmonic dispensing device (optical modulator) 26 disposed in the output path of the laser pulse. In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of the admitted prior art by including a harmonic dispensing device (optical modulator) in the output path of the laser pulse. The ordinary artisan would have been motivated to modify the admitted prior art in the manner described above for the purpose of preventing at least a portion of secondary laser emission from impinging on a work piece (column 2, lines 30-35).

10. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Johnson.

The difference between the admitted prior art and the claimed invention is the article being a printed circuit board. Johnson discloses a laser-processing machine wherein the work is a printed circuit board (see Figure 1 and column 5, lines 49-57). In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of the admitted prior art by using a printed circuit board as the work. The ordinary artisan would have been motivated to modify the admitted prior art in the manner described above for the purpose of using a laser to attach leads to circuit contacts (column 1, lines 65-67).

11. Claims 10-15, 28, 29, 30, 31-33, 36, 39, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson in view of Smart.

In regards to claims 10, 39, and 42, Figures 2 and 3(d) of Johnson disclose a method of controlling a laser device having: an output mirror 44; a reflector mirror 42; and a gain medium 38 disposed between said output mirror 44 and reflector mirror 42 for accumulating laser gain, said method comprising the steps of: turning on the laser oscillation during a first pause period before a generation of the laser pulse train; and turning off the laser oscillation during a second pause period before a generation of the laser pulse. The difference between Johnson and the claimed invention is the laser light continuously oscillates during the first pause period and the excitation light has identical power during the first and second pause periods. Figure 3 of Smart discloses having a continuous laser oscillation during a portion of a first pause period, which is a result of continuously pumping the amplifying medium with a laser pump having constant power (column 5, lines 8-36). In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of Johnson by continuously pumping the amplifying medium, which results in continuous oscillation during the first pause period. The ordinary artisan would have been motivated to modify Johnson in the manner described above for the purpose of simplifying the electronics used to control the laser pump (column 2, lines 45-57).

In regards to claims 11 and 29, Figure 2 of Johnson discloses the step of dispensing only the laser pulse 47.

In regards to claims 12 and 30, a further difference between Johnson and the claimed invention is dispensing only the laser pulse by an optical modulator. Figure 1 of Smart discloses a laser device with an optical modulator 26 disposed in the output path of the laser pulse. In view of such teaching, it would have been obvious to the ordinary artisan at the time the

invention was made to modify the invention of Johnson by using an optical modulator to dispense the laser pulse. The ordinary artisan would have been motivated to modify Johnson in the manner described above for the purpose of preventing at least a portion of secondary laser emission from impinging on a work piece (column 2, lines 30-35).

In regards to claims 13 and 31, as best the examiner can ascertain the claimed invention, Figure 3(d) and 3(e) of Johnson disclose the second pause period is equal to a duration comprising a width of each laser pulses extracted from a period of the laser pulse train.

In regards to claims 14 and 32, as best the examiner can ascertain the claimed invention, Figure 3(d) and 3(e) of Johnson disclose the second pause period is less than a duration comprising a width of each laser pulses extracted from a period of the laser pulse train.

In regards to claims 15 and 33, Figures 3(d) and 3(e) Johnson disclose a power of the laser pulse is controlled with the second pause period.

In regards to claim 28, Figures 2 and 3(d) of Johnson disclose a method of processing an article using a laser processing machine including a laser device having: an output mirror 44; a reflector mirror 42; and a gain medium 38 disposed between said output mirror 44 and reflector mirror 42 for accumulating laser gain, said method comprising the steps of: turning on the laser oscillation during a first pause period before a generation of the laser pulse train; and turning off the laser oscillation during a second pause period before a generation of the laser pulse. The difference between Johnson and the claimed invention is the laser light continuously oscillates during the first pause period. Figure 3 of Smart discloses having a continuous laser oscillation during a portion of a first pause period, which is a result of continuously pumping the amplifying medium (column 5, lines 8-36). In view of such teaching, it would have been obvious to the

ordinary artisan at the time the invention was made to modify the invention of Johnson by continuously pumping the amplifying medium, which results in continuous oscillation during the first pause period. The ordinary artisan would have been motivated to modify Johnson in the manner described above for the purpose of simplifying the electronics used to control the laser pump (column 2, lines 45-57).

In regards to claim 36, Johnson discloses the article is a printed circuit board (column 5, lines 49-57).

12. Claims 16, 34, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson in view of Wiechmann et al. (US Pat. 6,009,110, hereinafter Wiechmann).

In regards to claims 16 and 34, the difference between Johnson and the claimed invention is generating harmonic laser light from a fundamental wave laser by the laser oscillation. Figure 1 of Wiechmann discloses generating a harmonic laser from a fundamental wave laser by laser oscillation (column 2, lines 53-67). In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of Johnson by including the step of generating a harmonic laser from a fundamental wave laser. The ordinary artisan would have been motivated to modify Johnson in the manner described above for the purpose of generating an output laser with a shorter wavelength.

In regards to claim 35, it is further obvious in the method of Johnson and Weichmann to include the step of separating the harmonic laser light and the fundamental wave laser light, as disclosed in Weichmann (column 3, lines 15-33), for the purpose of obtaining a single output laser with a specified wavelength.

Response to Arguments

13. Applicant's arguments filed December 30, 2002 have been fully considered but they are not persuasive.

In response to Applicant's arguments regarding claims 1-9, 18-27, 37, 38, 40, and 41 that nowhere in applicant's disclosure is there a statement that a prior art laser device has structure for operating in the manner described by the claims (page 22), a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

Applicant's arguments with respect to claims 10-17, 28-36, 39, and 42 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew C. Landau whose telephone number is (703) 305-4396.

The examiner can normally be reached from 8:00 AM-4: 30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Matthew C. Landau
Examiner
March 17, 2003